

## **AMENDMENTS**

### **In the claims:**

Please amend the claims as follows.

Claims 1-20. (Cancelled)

21. **(Currently Amended)** An apparatus for fabricating an addressable array of biopolymer probes on a substrate according to a target array pattern which apparatus, when operated according to a target drive pattern based on nominal operating parameters of the apparatus, provides the probes on the substrate in the target array pattern, the apparatus comprising:

(a) a sensor which senses at least one operating parameter for an error from a nominal value which error will result in use of the target drive pattern producing a discrepancy between the target array pattern and an actual array pattern deposited, wherein:

said sensor views at least one of:

- (i) a dispensing head;
- (ii) a nozzle; and
- (iii) a droplet pattern previously dispensed from said head,

wherein said viewing comprises capturing one or more images of said droplet pattern; and

(b) a processor which, when an error is detected by the sensor, derives, based on the error, a corrected drive pattern different from the target drive pattern such that use of the corrected drive pattern results in a reduced discrepancy between the target and actual array patterns.

22. (Previously Presented) An apparatus according to claim 21 additionally comprising:

a dispensing head to dispense fluid droplets containing the probes or probe precursors, and a transport system to move at least one of the dispensing head

and substrate relative to the other as the droplets are dispensed from the head, so as to form the array;

and wherein:

said target drive pattern or said corrected drive pattern controls operation of the transport system;

the operating parameter is the position of the substrate or dispensing head; and

the sensor views the substrate or dispensing head to obtain its position.

23. (Original) An apparatus according to claim 22 wherein the sensor views a fiducial mark on the dispensing head or substrate

24. (Previously Presented) An apparatus according to claim 21 additionally comprising:

a dispensing head with multiple nozzles to dispense fluid droplets containing the probes or probe precursors, and a transport system to move at least one of the dispensing head and substrate relative to the other as the droplets are dispensed from the head, so as to form the array;

and wherein:

said target drive pattern or said corrected drive pattern controls operation of the transport system; and

the operating parameter is the position of the dispensing head, or orientation of a nozzle.

25. (Original) An apparatus according to claim 21 additionally comprising a memory accessible by the processor to save the target drive pattern, and wherein the processor, when no error is detected, causes the apparatus to operate in accordance with the target drive pattern.

26. (Previously Presented) An apparatus according to claim 21 comprising a memory accessible by the processor to save the target drive pattern, and wherein the processor:

when no error is detected, causes the apparatus to operate in accordance with the target drive pattern; and  
when an error is detected and a corrected drive pattern is derived by the processor, saves the corrected drive pattern in the

memory.

27. (Previously Presented) An apparatus according to claim 21 wherein the processor derives the corrected drive pattern without obtaining a target drive pattern.

28. (Original) An apparatus according to claim 21 additionally comprising:  
a dispensing head to dispense fluid droplets containing the probes or probe precursors; and  
a transport system to move at least one of the dispensing head and substrate relative to the other as the droplets are dispensed from the head, so as to form the array;

and wherein the processor controls operation of the transport system in accordance with one of the drive patterns.

29. (Original) An apparatus according to claim 28 wherein the processor saves the target drive pattern in the memory, and saves the corrected drive pattern in the memory prior to operating the dispensing head and transport system to form the array.

30. (Currently Amended) An apparatus according to claim 21 additionally comprising a memory accessible by the processor, wherein

the processor saves the target drive pattern in a memory of the **deposition** apparatus; and

the processor derives the corrected drive pattern by modifying, based on the detected error, instructions to at least one apparatus component based on the target drive pattern during deposition of the probes to form the array.

31. **(Currently Amended)** An apparatus according to claim 25 wherein the at least one parameter is the position of the substrate in the ~~deposition~~ apparatus.

32. (Original) An apparatus according to claim 28 wherein the at least one parameter is a position of the dispensing head.

33. (Previously Presented) An apparatus according to claim 28 additionally comprising a position encoder to detect the position of the dispensing head or the substrate, and wherein the at least one parameter is an accuracy of the encoder.

34. (Previously Presented) An apparatus according to claim 28 wherein the at least one parameter is an accuracy in an ability of the transport system to move the dispensing head or substrate to an expected location in response to a command.

35. (Original) An apparatus according to claim 34 wherein the transporter moves the dispensing head or substrate along a corresponding nominal axis, and wherein the at least one parameter is the deviation of actual movement from the corresponding nominal axis.

36. (Original) An apparatus according to claim 28 wherein the dispensing head has multiple droplet dispensing nozzles, and wherein the at least one parameter is a position of a nozzle.

37. (Previously Presented) An apparatus for fabricating an addressable array of biopolymer probes on a substrate according to a target array pattern, comprising

(a) a memory to store a target drive pattern based on nominal operating parameters of the apparatus to provide the probes on the substrate in the target array pattern;

(b) a processor to receive an indication of an error from a nominal value in at least one operating parameter, which error will result in use of the target drive pattern producing a discrepancy between the target array pattern and an actual array pattern deposited, and to derive a corrected drive pattern from the target drive pattern such that use of the corrected drive pattern results in a reduced discrepancy between the target and actual array patterns,

wherein the at least one operating parameter is the position of a dispensing head or orientation of a nozzle, and is examined by viewing at least one of:

- (i) a dispensing head;
  - (ii) a nozzle; and
  - (iii) a droplet pattern previously dispensed from said head,
- wherein said viewing comprises capturing one or more images of said droplet pattern.

38. (Previously Presented) An apparatus for fabricating an addressable array of biopolymer probes on a substrate carrying at least one fiducial mark, the apparatus comprising:

a dispensing head to dispense fluid droplets containing the probes or probe precursors and having at least one fiducial mark;

a sensor to sense the position of the at least one fiducial mark on the dispensing head, and

a transporter which based on the position of the at least one fiducial mark as sensed by the sensor, can rotate the substrate to a predetermined angular relationship with respect to the dispensing head.

39. (Original) An apparatus according to claim 37 wherein the corrected drive pattern is saved in the memory.

40. (Previously Presented) A computer program product, for use on an apparatus for fabricating an addressable array of biopolymer probes on a substrate according to a target array pattern which apparatus, when operated according to a target drive pattern based on nominal operating parameters of the apparatus, provides the probes on the substrate in the target array pattern;

the program product comprising: a computer readable storage medium having a computer program stored thereon which, when loaded into a computer of the apparatus performs the steps of:

(a) receiving a signal from a sensor which senses at least one operating parameter for an error from a nominal value which error will result in use of the target drive pattern producing a discrepancy between the target array pattern and an actual array pattern deposited, wherein:

said sensor views at least one of:

- (i) a dispensing head;
  - (ii) a nozzle; and
  - (iii) a droplet pattern previously dispensed from said head,
- wherein said viewing comprises capturing one or more images of said droplet pattern; and

(b) when an error is detected by the sensor, deriving, based on the error, a corrected drive pattern different from the target drive pattern such that use of the corrected drive pattern results in a reduced discrepancy between the target and actual array patterns.

41. (Original) A computer program product according to claim 40, wherein the program additionally performs the step of operating the apparatus according to the corrected drive pattern.

42. (Original) A computer program product according to claim 41, wherein the program additionally performs the steps of saving the target drive pattern in a memory

of the apparatus, and saving the corrected drive pattern in the memory prior to operating the apparatus according to the corrected drive pattern.

43. **(Currently Amended)** A computer program product according to claim 41 wherein the program additionally performs the steps of:

    saving the target drive pattern in a memory of the **deposition** apparatus;  
and

    deriving the corrected drive pattern by modifying, based on the detected error, instructions to at least one apparatus component based on the target drive pattern, during deposition of the probes to form the array.

44. **(Previously Presented)** A computer program product, for use on an apparatus for fabricating an addressable array of biopolymer probes on a substrate according to a target array pattern which apparatus, when operated according to a target drive pattern based on nominal operating parameters of the apparatus, provides the probes on the substrate in the target array pattern

    the program product comprising: a computer readable storage medium having a computer program stored thereon which, when loaded into a computer of the apparatus performs the steps of:

    (a) storing the target drive pattern in a memory;  
    (b) receiving an input signal indicating an error from a nominal value in at least one operating parameter, which error will result in use of the target drive pattern producing a discrepancy between the target array pattern and an actual array pattern deposited; and

    (c) deriving a corrected drive pattern from the target drive pattern such that use of the corrected drive pattern results in a reduced discrepancy between the target and actual array patterns,

    wherein the at least one operating parameter is the position of a dispensing head or orientation of a nozzle, and is examined by viewing at least one of:

        (i) a dispensing head;

- (ii) a nozzle; and
- (iii) a droplet pattern previously dispensed from said head, wherein said viewing comprises capturing one or more images of said droplet pattern.

45. (Original) A computer program product according to claim 44, wherein the program additionally performs the step of operating the apparatus according to the corrected drive pattern.

46. (Previously Presented) An apparatus according to Claim 21, wherein said sensor views the dispensing head.

47. (Previously Presented) An apparatus according to Claim 21, wherein said sensor views the nozzle.

48. (Previously Presented) An apparatus according to Claim 21, wherein said sensor views a droplet pattern previously dispensed from said head, wherein said viewing comprises capturing one or more images of said droplet pattern.